



Quick Invertebrate Guide

An introduction to identifying Australian invertebrates



Introduction

The *Quick Invertebrate Guide* was created by Matthew Bulbert and Scott Ginn.

Illustrations were prepared by Andrew Howells.

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Scope of the document:

BugWise Quick Invertebrate Guide has been prepared by Australian Museum staff who work on invertebrate behaviour, taxonomy and ecology. It has been designed to assist identification of terrestrial invertebrates. More specifically, the guide was designed for students undertaking invertebrate studies or volunteers that may be involved in sorting invertebrate material.

The guide is arranged unlike other such guides due to a number of practical considerations.

- 1) The hyper-diverse groups are presented first. These are the invertebrate groups that have the most members and are generally the most varied in appearance and their habits. So for any invertebrate collection event they tend to dominate the composition of the catch. These groups include beetles, bugs, flies, hymenoptera, butterflies and moths, lacewings and spiders
- 2) Where feasible, groups that look like one another are grouped together.
- 3) The text specifies the key features that separate each group. For some features specialised equipment such as a microscope may be needed.

For a more detailed guide including more details on common attributes, behaviour and potential misidentifications consult BugWise's Invertebrate Guide which is accessible at the website listed below.

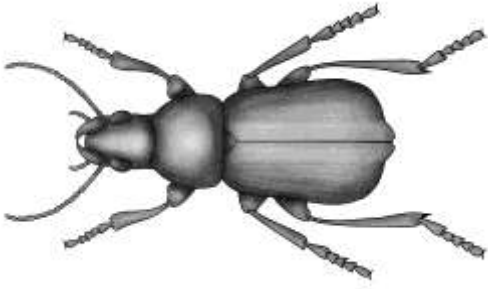
If you wish to comment on Quick Invertebrate Guide, please visit our site at www.australianmuseum.net.au/bugwise

On the website, you will also find detailed information about other invertebrates and their role in the environment via links on the BugWise page.

Happy hunting!

The BugWise Team

Beetles including weevils – Coleoptera

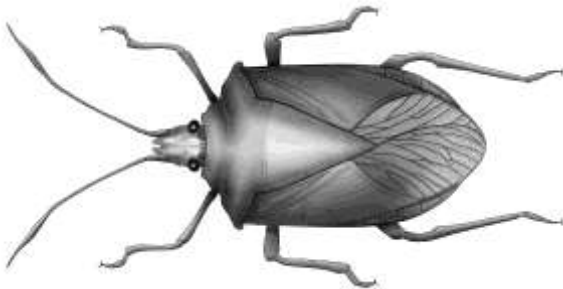


- Forewings rigid, no visible veins.
- Forewings at rest meet at midline.
- Mouthparts for chewing or munching.

Bugs - Hemiptera

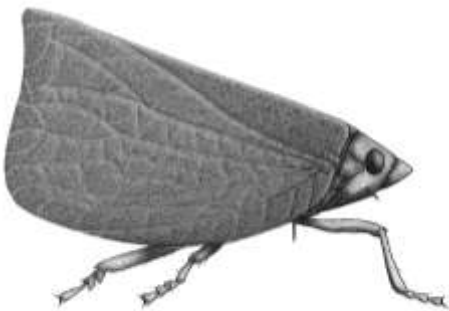
All bugs have tube-like mouthparts for piercing and sucking. Three bug subgroups:

True bugs



- Antennae thread-like.
- Mouthparts tube-like coming from nose area.
- One or two pairs of wings, if present.
- Forewing half membranous, half hardened.

Cicadas and hoppers



- Antennae bristle-like, first segment swollen.
- Mouthparts thorn-like and coming from chest area.
- Two pairs of wings, membranous.
- Hind legs often enlarged for jumping.

Psyllids, aphids, scale insects, white flies



- Body shape highly variable (see major description in BugWise Invertebrate Guide).
- Antennae thread-like if present.
- Mouthparts thorn-like and coming from chest area.
- One or two pairs of wings if present, membranous.

Ants, bees, wasps, sawflies – Hymenoptera

Ants



- Body constricted at 'waist'. One or two knobs at waist.
- Mouthparts for chewing or munching.
- Two pairs of wings if present, clear and with few veins and cells.

Wasps



- Body constricted at 'waist' appears pinched or like a leaf stalk.
- Antennae thread-like or club-like.
- Mouthparts for chewing or munching.
- Two pairs of wings, if present with few veins, veins never reach wing margin.
- Abdomen tip with long spike sometimes hidden.

Bees



- Body constricted at the 'waist' (not always obvious).
- Body has forked hairs.
- Eyes large to very large.
- Mouthparts used for cutting and lapping.
- Two pairs of wings, clear with few veins and cross-veins.
- Hind legs are enlarged and have forked hairs.

Sawflies



- Body lacks constriction at 'waist'.
- Mouthparts for cutting and munching.
- Two pairs of wings, veins form cells with at least one vein extending to margin of wing.
- Abdomen tip with saw-like egg laying tube sometimes visible but often folded into a groove, much like a pocket knife.

Flies incl. mosquitoes – Diptera



- Antennae generally short, form variable among species.
- One pair of functional wings if present.
- Hind wings replaced by club-like structures called *halteres*.

Moths and butterflies - Lepidoptera



- Body, legs, and/or wings have overlapping scales.
- Antennae never longer than body.
- Mouthparts if present are a long feeding tube coiled under the head at rest.
- Two pairs of wings, if present, often patterned or textured.

Lacewings - Neuroptera



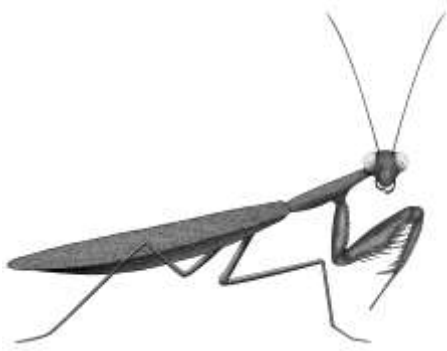
- Antennae thread-like or bead-like, and has many segments.
- Mouthparts has long palps (mouthparts that look like a 'chain of beads').
- Two pairs of wings with forked veins along wing margin with few exceptions.
- At rest wings held tent-like over body.
- One group with raptorial fore legs.

Dragonflies and damselflies - Odonata



- Body long and narrow.
- Antennae short and hair-like.
- Eyes large and bulging.
- Two pairs of wings clear and have numerous cross-veins forming many cells.
- Wings held outstretched or pressed together at rest.

Praying mantids - Mantodea



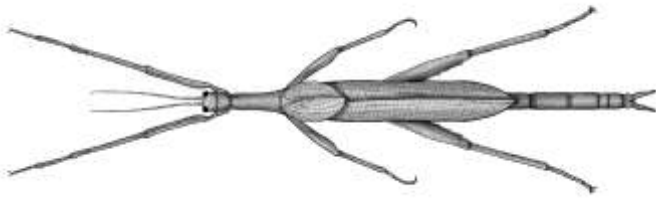
- Head triangular.
- At rest the wings are held flat over body, or curved around abdomen, overlapping.
- Forelegs are always raptorial, that is, bearing rows of sharp teeth, which are used for clasping prey.

Grasshoppers, Locusts, Crickets, Katydid - Orthoptera



- Segment behind head draped over sides to form large lateral lobes.
- One or two pairs of wings if present. Forewing hardened, appearing like cracked leather.
- Wings cover abdomen in most species.
- Hind legs shaped like a chicken drumstick.

Stick insects - Phasmatodea



- Body stick-like or cigar-shaped while other varieties include leaf-shaped and grass-like.
- Two pairs of wings, if present.
- Hindwing folds like a hand fan and much longer than forewing.
- At rest wings are held flat or rolled around body, overlapping and much shorter than the abdomen.
- Groove at base of forelegs in which the head rests when the legs are held in front outstretched.

Cockroaches - Blattodea



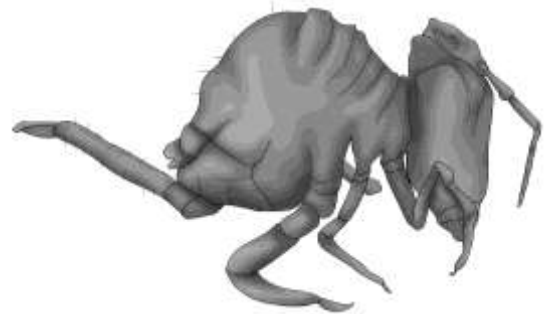
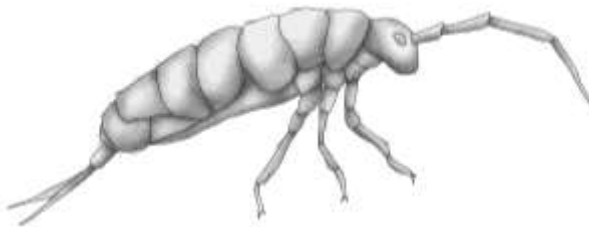
- Body oval, flattened as if pressed from above.
- Mouthparts for chewing or munching.
- Two pairs of wings if present. At rest forewings overlapping.
- Many species do not have wings.
- Legs with many spines. Abdomen tip:
- Two cerci (tails) never longer than the body.

Psocids and booklice – Psocoptera



- Body ovoid or abdomen swollen making it look like a lopsided dumb-bell;
- Some flattened as if pressed from above;
- Front of head bulges like a big round nose;
- Antennae thread-like, usually longer than half their body length.
- Two pairs of wings, if present (males only) .
- Forewing with few cross-veins and 'S shaped' veins.

Springtails - Collembola



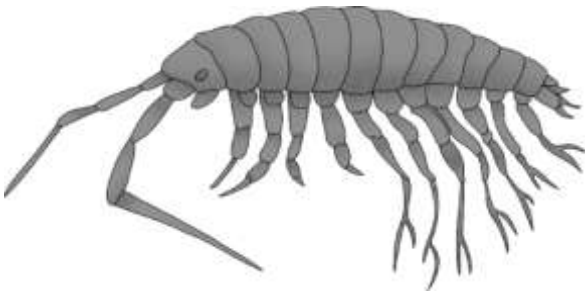
- Body globular or column-like.
- Has a siphon tube just behind the rear legs. This tube is prominent in springtails that have a small springing organ.
- Eyes absent or very small.
- Abdomen tip with forked springing organ or anal spine (often folded under the abdomen).

Thrips – Thysanoptera



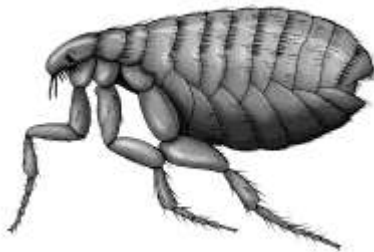
- Head square or rectangular-like.
- Antennae bead-like or thread-like.
- Eyes berry-like.
- Two pairs of wings, if present. Both pairs thin with no more than three veins.
- Margins entirely or partially lined with long hairs.
- Adhesive bladders expand from last 'toe' segment.

Landhoppers - Amphipods



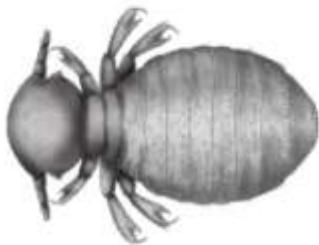
- Two antennae
- Different length legs
- Jump erratically when alive
- Thin

Flea - Siphonaptera



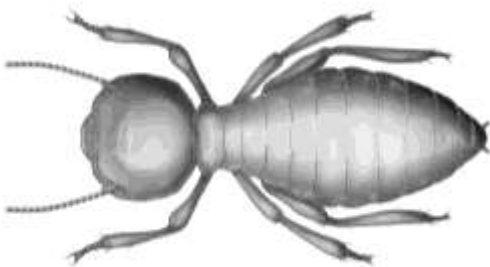
- Body very thin as if pressed from the sides.
- Covered with hairs and spines directed backwards.
- Hindlegs enlarged and modified for jumping;
- Have claws modified for clinging to feathers and hair.

Louse - Phthiraptera



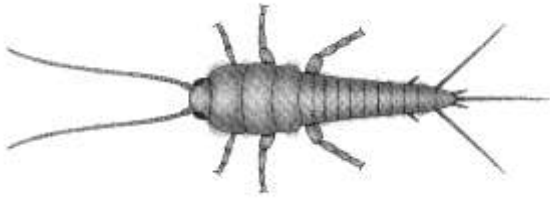
- Body flattened as if pressed from above.
- Have modified hook-like claws for clinging to feathers or fur.

Termites - Isoptera



- Body column-like, or dumbbell-like.
- Head sometimes extend to a sharp point.
- Antennae beadlike.
- Mouthparts for chewing or munching.
- Two pairs of wings in reproductive castes at rest, wings are held flat over body, overlapping.
- Abdomen tip with two short cerci (tails) with few segments.

Silverfish – Thysanura



- Body column-like, tear-drop or spindle- shaped.
- Often hairy, with tufts common between eyes
- Covered in scales that come off when touched.
- Have tiny styli (soft finger-like projections) coming from the underside some of the abdomen segments.
- Abdomen with three tails, thread-like, and similar in size.

Earthworms - Oligochaeta, Haplotaxida



- Body snake-like with many segments.

Centipedes – Chilopoda



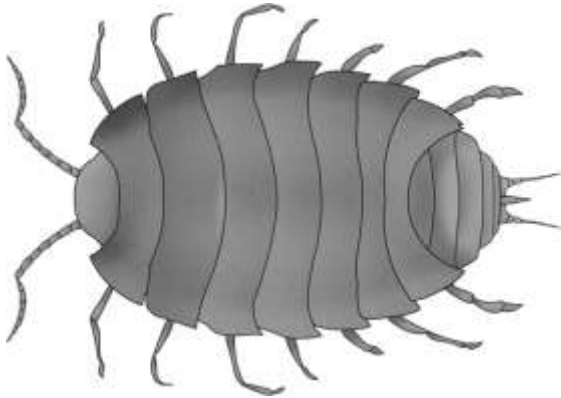
- Limbs 15 to 191 pairs of legs (always an odd number), one pair per body segment.
- Body tip has thread-like or forcep-like appendages that have a sensory, grasping or defensive function.

Millipedes – Diplopoda



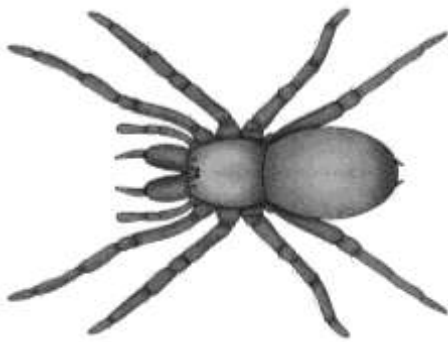
- Usually long and slender.
- Majority of segments with two pair of legs attached.
- Body usually curved.
- Most coil when disturbed but some do roll into a ball.

Slaters – Isopoda



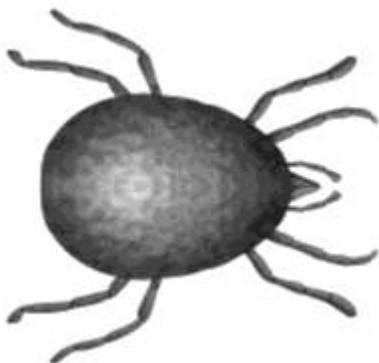
- 7 pairs of legs 1 per segment.
- 2 pairs of antennae, but 1 difficult to see.
- Wide with curved surface.
- Many roll into a ball when disturbed.

Spiders – Araneae



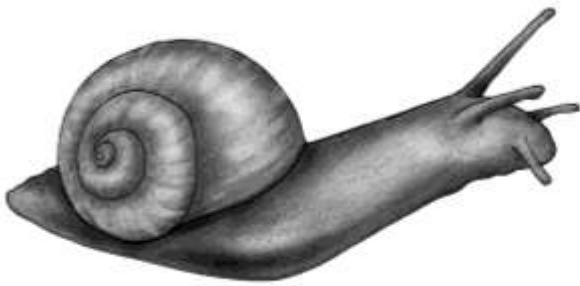
- Constriction between cephalothorax (front portion containing head) and the abdomen.
- Abdomen without segments.
- Eight legs.
- Fangs often visible.
- Spinnerets (silk distributing organs) originate under the abdomen and sometimes extend well past the tip.

Mites and ticks – Acarina



- Most are microscopic.
- Body without constrictions.
- Body shape highly variable.
- Abdomen without segments.
- Eight legs but young mites often have only six.

Snails and slugs - Gastropoda



- Body soft and slimy.
- Shell obvious in snails.
- Have one or two tentacles.

Proturans – Protura

- Less than 2mm in length.
- Long and column-like or spindle-shaped.
- No antennae, eyes or wings.
- Soil dwelling rarely seen.

Diplurans - Diplura

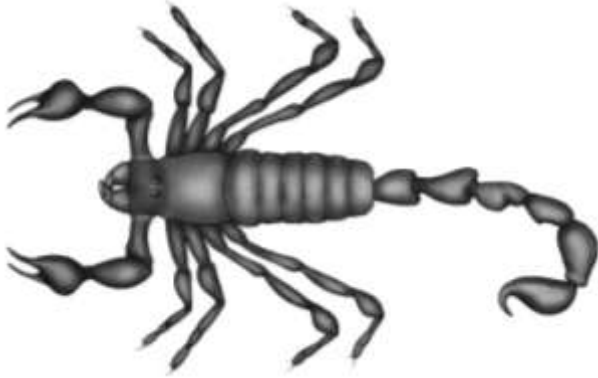
- 5-50 mm long.
- Antennae long and bead-like.
- Mouthparts hard to see.
- Have 2 long cerci ('tails') with many segments or forcep-like.

Earwigs – Dermaptera



- Body flattened as if pressed from above.
- Two pairs of wings if present.
- Forewing hardened, without veins; rectangular shaped and much shorter than abdomen.
- Hindwing folds like a hand fan.
- At rest the wings are held flat to body, meeting at midline.
- Abdomen tip has two hardened tails modified as forceps.

Scorpions – Scorpionida



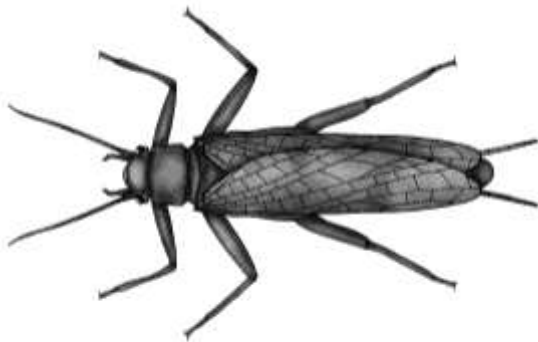
- Abdomen is segmented.
- Pectines (a sensory organ) present on underside of body behind legs.
- Pedipalps (appendages between first legs and mouthparts) are large with pincers (chela) at their ends.
- Abdomen forms a long tail with sting at tip.

Pseudoscorpions – Pseudoscorpionida



- Size less than 10 mm in length.
- Abdomen is segmented, flattened as if pressed from above.
- Eight legs.
- Pedipalps are large with pincers (chela) at their ends.

Stoneflies – Plecoptera



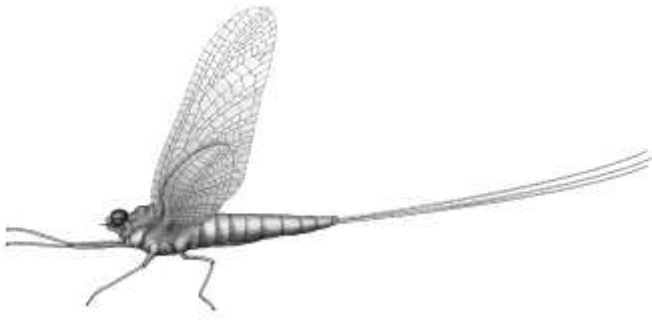
- Mouthparts for chewing or munching.
- Two pairs of wings, if present.
- Moderate to numerous cross-veins.
- At rest, wings overlap and are held flat over body or often curving around the abdomen.
- Generally cover the abdomen though a few species have short wings.
- Fore- and midlegs held out from body and bent at the 'elbows'.
- Abdomen tip with two moderately long cerci (tails) with many segments.

Alderflies and Dobsonflies - Megaloptera



- Eyes large, bulging and well separated.
- Mouthparts for chewing or biting.
- Two pairs of wings. Both pairs clear and have moderate cross-veins forming mainly rectangular cells.
- Hindwing usually wider than forewing due to a foldable lobe at the base of the wing.
- At rest wings held tent-like over body, hindwing hidden.

Mayflies – Ephemeroptera



- Antennae very short, bristle-like or thread-like.
- Eyes large, covering most of the head, and are very close together or actually touch.
- One or two pairs of wings but usually two.
- Hindwings much smaller than forewings.
- Both wings clear and have numerous cross-veins forming many cells.
- At rest wings are held upright above abdomen often pressed together.
- Abdomen tip with two to three tails, all longer than body.

Caddis-flies – Trichoptera



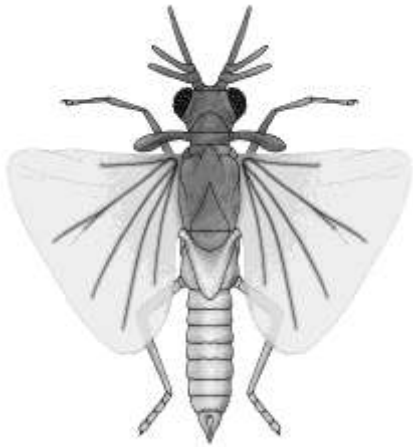
- Body, wing surface and legs covered in hairs.
- Antennae longer than half its body length, to much longer than the body.
- Mouthparts small and mostly non-functional.
- Palps (mouthparts that look like a chain of beads) usually long and visible.
- Two pairs of wings held tent-like or rarely flat over body.
- Limbs often with paired spines at joints.

Hanging-flies and scorpion-flies – Mecoptera



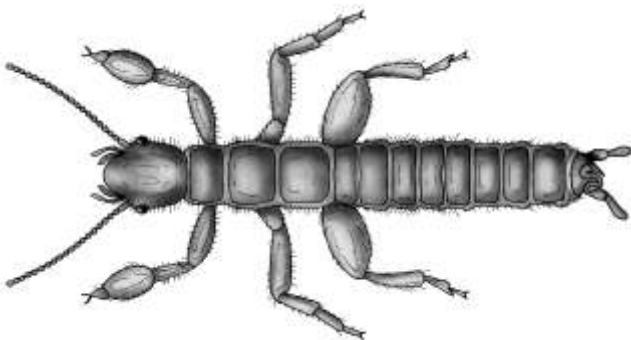
- Head with a beak-like extension.
- Antennae thread-like, with many segments and longer than half their body length.
- Two pairs of wings if present (though rarely absent).
- Both clear, and have numerous cross-veins forming mainly rectangular cells.
- At rest most hold their wings tent-like above their body though some species overlap them.
- Limbs have large spines at joints.
- Often have large claws for grabbing onto prey and plants.

Stylops – Strepsiptera



- Females larva-like.
- Segment behind head of male small but segment bearing hindwings enlarged.
- Antennae branched, antler-like and never longer than body.
- Eyes berry-like, bulging or extended on short stalks, and well separated.
- Mouthparts non-functional.
- Two pairs of wings.
- Forewings very small, club-like and hardened; no veins.
- Hindwings broad, cape-like and with few veins and no cross-veins.

Webspinner – Embioptera



- Antennae bead-like.
- Body narrow.
- Two pairs of spatula-shaped wings, if present.
- Have 'Popeye arms'
- Two short tails, right and left tails different in size and shape in males.